have led to the conclusion that Bidwell's theory as to the important rôle of the selenides is unsatisfactory, and that the conductivity depends almost wholly upon the metallic selenium formed throughout the amorphous modification when heated to a temperature of about 200° C. Hesehus has developed an interesting theory of the "allotropic dissociation of selenium," which, on the whole, explains satisfactorily the behavior of the cells.

(3) The constants of the cell must change only little in time, with temperature and atmospheric conditions; but, in this respect also, the selenium cell is by no means perfect. A sensitive cell has a granular structure with numerous minute pores and interstices between the granules, doubtless due to the fact that with the transformation of the amorphous modification to the metallic, which latter has a considerably larger density, irregular contraction will occur and cracks be formed. Expansion caused by an increase of temperature will be followed by a closer electrical contact between the granules and a lowering of resistance. In some cases this temperature effect is very large and it differs in cells of different construction.[10] Carpini[11] found that on heating a cell through 80° or 90° C. the resistance dropped to almost one-tenth of its original value, an enormous change which may, however, in part be due to some transformation into the conducting modification.

Increase of external pressure will also decrease the resistance, as Brown[12] has shown.

Moisture absorbed by the pores doubtless influences the electrical conductivity and thus necessitates the use of a vacuum chamber for the cell.

If I add to this that in course of time the sensitiveness changes, that the contact between the selenium and the electrodes often loosens, and that there is a very annoying after effect, i. e., that the action of the cell is quite sluggish, especially in its return to the original high resistance after the light is shut off, it is apparent that we have not as yet a cell which can be used with any degree of satisfaction for the measurement of intensity of illumination.[13]

Of course it is a different matter if we wish to determine a definite instant at which a sudden change of illumination takes place, as Wulf and Lucas have done in their investigation in connection with the eclipse. It seems that they were able to determine accurately the exact time of first apparent contact of the sun's and moon's disks as well as the end of totality; but only the most sanguine admirer of the selenium cell would dare to draw any conclusion as to the actual change of intensity from the curve given by these investigators, even if we suppose that all spectral colors from the sun are diminished in the same ratio as the eclipse progresses.[14]

WEST INDIAN CHART.

Among the changes in the WEATHER REVIEW for 1906 many will note the absence of the chart of isobars and isotherms for the West Indies. This chart has been kept up in the hope that its usefulness might lead to some system of cooperation among the isolated West Indian services and stations, and eventually to the publication of more complete and satisfactory meteorological and climatological data. Such a union of effort has not yet been attained, but may be realized hereafter, and meanwhile we shall hope to publish occasional references to current sources of information.

The weather of tropical regions is popularly supposed to be very uniform from day to day and year to year, but for this very reason a slight change in temperature or moisture, sunshine or rainfall, has a disproportionately large influence on plants and animals. The large changes that we experience in temperate zones would be disastrous in the Tropics. The regular publication of continuous meteorological details, as well as the different charts for the West Indies, is as important to the student as are the similar publications for the United States. In fact, however, their value to biological studies is not the most important argument for the publication of such monthly charts. The changes in location of the general or tropical areas of high and low pressure, wind, and rain that produce variations in West Indian weather are undoubtedly due to great changes in the general atmospheric conditions over the whole globe. Storms form as the result of these conditions, and we need a daily chart of the West Indies and adjacent regions, with weekly and monthly synoptical charts, such as Hildebrandsson has published, showing the departures from normal, in order to realize the intimate relation between the equatorial and the polar oscillations.—*C. A.*

[10] Aiki and Tanakadate, Math. and Phys. Soc., Tokyo, 16, 217, 1904.
[11] Carpini, Lincei Rend. 14, 667, 1905.
[12] Brown, Phys. Rev. 20, 185, 1905.
[13] See also Dorsey, Monthly Weather Review, 27, 99, 1899, and Berthier, L'Ecl. electr., 38, 441, 1904.
[14] Schwarzschild and Villinger, Phys. Zeitschr., 6, 737, 1905.

PHENOLOGICAL STUDY.

E. N. Transeau, Professor of Biology, Alma College, Michigan, in acknowledging the receipt of a copy of Bulletin 36, says:

> Regarding phenological data I believe the Weather Bureau could secure sufficient data to publish a really valuable map and discussion of this interesting phase of plant geography. The data would have to be secured largely from amateur collectors, for so far as I know very little has been published along this line in this country. Data might also be obtained from herbarium specimens in the larger collections.

Phenology—considered as the study of the development of plants from one epoch to another throughout life—does not belong to meteorology, but to biology, and indeed requires the services of a skilled botanist. If this study should be well organized, under the proper division and bureau of the Department of Agriculture, then many Weather Bureau observers would doubtless be pleased to cooperate, but we can not take the initiative in this matter.—*C. A.*

BACK NUMBERS OF THE WEATHER REVIEW.

The editor will be glad to hear promptly from anyone who desires to complete his set of the MONTHLY WEATHER REVIEW, as it is possible that the accumulation of back numbers may now enable us to complete such sets.—*C. A.*

RESTRICTIONS ON PUBLICATIONS AND THEIR DISTRIBUTION.

In connection with the publication of the MONTHLY WEATHER REVIEW it is proper to remind our correspondents and recipients of the General Order (No. 96, April 14, 1906) recently issued by the Secretary of Agriculture:

> In view of the restrictions placed on the funds available for printing and binding for this Department, and in view of the constantly increasing demands upon these funds, it becomes necessary to adopt restrictive measures in regard to the issue of publications. It is quite as incumbent upon the Department to publish the information it has acquired as to conduct the laboratory work and field and other investigations by which this information is obtained. The only limit placed upon the acquisition or diffusion of this information is that it shall be of value to agriculture.[1] Four ways only seem available by which the expense of the printing and binding for this Department may be judiciously restricted:
>
> First, by prevention of the waste inevitably accompanying a general gratuitous distribution.
>
> Secondly, by careful editing (in the manuscript) of every document submitted for publication, with a view to presenting the facts in the briefest, most succinct style compatible with clearness.
>
> Thirdly, by rigid suppression of the tendency to reedit in the proof, and,

[1] Undoubtedly this is to be interpreted as including all the work of the Department of Agriculture.—EDITOR.

Fourthly, by restriction of illustrations to such as are absolutely necessary.

General orders have already been issued enforcing the second, third, and fourth conditions, and it is only necessary here to reiterate them with added emphasis.

To carry out the first condition it is ordered that hereafter the first edition of every publication shall be limited to such number as is necessary to supply libraries, educational institutions, the press, State, and foreign officials connected with agriculture, exchanges, and such persons as are rendering tangible service to the Department, either by active cooperation in its work or as special correspondents; and, in addition, a small number, to be reserved for emergencies and for use in correspondence, and to furnish a small supply to be placed in the hands of the Superintendent of Documents for sale. Hereafter all reprints shall be confined to such numbers as may be necessary to replenish the supply of the Superintendent of Documents, where the demand for the same, at a price fixed by the Public Printer, continues.

Chiefs of bureaus, offices, and divisions maintaining free mailing lists will cause the same to be rigidly revised in accordance with the distribution indicated above.

This order does not apply to Farmers' Bulletins or to emergency circulars.

METEOROLOGICAL WORK IN CHINA.

By C. FITZHUGH TALMAN, U. S. Weather Bureau.

The Central Meteorological Observatory, at Tokyo, has just issued a series of publications presenting the results of meteorological observations, by Japanese observers, at the following points in the Chinese Empire for the periods indicated:

Chi-fu, latitude 37° 34′ N., longitude 121° 30′ E., October 1–December 31, 1904.

Hang-chau, latitude 30° 11′ N., longitude 120° 12′ E., October 6, 1904–December 31, 1905.

Han-kau, latitude 30° 35′ N., longitude 114° 17′ E., January 17–December 31, 1905.

Mukden, latitude 41° 48′ N., longitude 123° 23′ E., May 1–December 31, 1905.

Nanking, latitude 32° 5′ N., longitude 118° 49′ E., October 12, 1904–December 31, 1905.

Ryojun (Port Arthur), latitude 38′ 47′ N., longitude 121° 16′ E., July 17–December 31, 1905.

Sha-shi, latitude 30° 18′ N., longitude 112° 15′ E., January 18–December 31, 1905.

Tairen (Dalny), latitude 38° 56′ N., longitude 121° 36′ E., September 7, 1904–December 31, 1905.

Tientsin, latitude 39° 10′ N., longitude 117° 10′ E., September 19, 1904–December 31, 1905.

Yinkow, latitude 40° 40′ N., longitude 122° 14′ E., October 1, 1904–December 31, 1905.

An additional pamphlet contains results from the new Japanese station at Kushunkotan (Korsakovsk), in the island of Sakhalin, for the period from October 10 to December 31, 1905. The date of the opening of this station denotes the eagerness of the Japanese to extend their meteorological net work; for it will be remembered that the treaty by virtue of which southern Sakhalin ceased to be forbidden ground to Japanese enterprise was only signed September 5, 1905. It is also worthy of note that observations at Mukden began less than two months after the occupation of that city by the Japanese army, while the station at Tairen appears to have been operated for about four months within hearing, if not within range, of the enemy's guns at Port Arthur.

The tabulated results for the stations and periods given above fill about two hundred quarto pages, and are uniform in character with those of the second order stations in Japan as published in the Monthly Report of the Central Meteorological Observatory.

Meteorological observations on so ambitious a scale have not previously been undertaken in China, except at the well-known observatories of Hongkong and Zi-ka-wei, the former Russian observatory at Peking, and, latterly, at the German seaport of Tsingtao. The only other observations approaching them in fullness are those recently executed by British observers at Wei-hai-wei.

Of the new Japanese stations four are located at points for which meteorological data appear to have been heretofore entirely lacking; these are Sha-shi, Nanking, Hang-chau, and Tairen.

A fringe of meteorological stations now extends along the China coast, and eight stations exist in the Yang-tze valley above Shanghai. The greater part of these stations are connected with the custom-houses and light-houses of the Imperial Chinese Maritime Customs, and report their observations to the Hongkong and Zi-ka-wei observatories. The Japanese will undoubtedly extend their meteorological service in Manchuria, and are said to be contemplating the establishment of a large meteorological and magnetic observatory at Peking. In the extreme south observations are made at the inland treaty ports of Wu-chau and Lung-chau. Meanwhile the "back blocks" of China—the regions away from the coast and the treaty ports—are completely unknown to the meteorologist, who stands sorely in need of more information concerning the climate of the whole interior of the Asiatic Continent.

China is now dotted over with missionary stations; European and American engineers are building railroads, opening mines, and erecting manufactories in many parts of the Empire; and the Chinese Government is importing foreign teachers for several of its schools and colleges. To the meteorologist this means that China's population of possible meteorological observers is rapidly growing.

If we could press into the service of meteorology a tithe of the educated foreigners now resident in China, we should soon be able to fill some of the most regrettable gaps on the climatic charts of the globe, and also to obtain much light upon the problems connected with the winter "high" and the summer "low" of central Asia.

ABNORMAL APRIL TEMPERATURES IN NEW SOUTH WALES.

By H. A. HUNT, Acting Meteorologist. Dated Sydney Observatory, N. S. W., Australia, May 3, 1906.

The month of April, 1906, possessed such abnormal temperature features in New South Wales that a brief note thereon may be of interest to the readers of the MONTHLY WEATHER REVIEW.

Unseasonably warm weather was experienced throughout the month, and during the Easter holidays what might be termed a hot wave passed slowly over our state; its duration was most remarkable for the month of April. The following consecutive readings were recorded at the Sydney Observatory:

April, 1906.	° F.
13	76.8
14	79.0
15	87.2
16	85.0
17	81.2
18	88.0
19	84.6

Taking the mean temperature for the whole of this month at the observatory, we find that all previous records, extending back to the year 1859, have been eclipsed. The mean for the month just ended was 67.7° F., which is 3° in excess of the normal, and 0.5° higher than the previous next highest mean, that is, 67.2° F., which was the mean for April, 1897.

Taking the average of all maximum readings, the abnormal character of the heat becomes still more apparent. The average maximum for the month just ended was 75.8° F., or 4.9° above the normal, and 1.2° higher than the previous next highest average maximum, that is, 74.6° F., in April, 1897.

The following table shows the means for April, 1906, compared with the results for previous years, at Sydney Observatory: